Emlenton Bridge
Spanning the Allegheny River
on Travel Route 38 (Legislative Route 75)
Emlenton
Venango County
Pennsylvania

HAER No. PA-101

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Mid-Atlantic Region
National Park Service
Department of the Interior
Philadelphia, Pennsylvania 19106

HISTORIC AMERICAN ENGINEERING RECORD

Emlenton Bridge

HAER No. PA-101

Location: Spanning the Allegheny River on Travel Route 38 (Legislative Route 75)
Emlenton, Venango County, Pennsylvania

UTM: 17.607990.4558890
Quad: Emlenton

Dates of Construction:
1883 - Superstructure erected on earlier covered bridge piers.
1913 - Concrete ice breaker added on the center pier
1952 - Original floor replaced with steel grating, and concrete buttresses placed against the south abutment
1965 - North abutment reformed with concrete

Present Owner: Pennsylvania Department of Transportation

Present Use: Vehicular and pedestrian bridge

Significance: The existing Emlenton Bridge is significant in the areas of engineering and transportation, specifically for its age, size, type of truss, length of truss for this age, and material. The bridge was built in 1883 and has survived with its original Whipple trusses. Also referred to as double-intersection Pratt trusses, these spans are particularly long for this period. The substantial spans and deep truss account for the double-intersection configuration, which is used for greater strength. The original wrought-iron construction is also significant. The Wrought Iron Bridge Company of Canton, Ohio, was a prolific bridge building company in the 1800s, building bridges not only in the United States, but also in Canada and Mexico. The Emlenton Bridge is pictured in the company's 1885 catalog. The bridge currently has good integrity, with its portal ornament, erector's and county plaques, data plates, and decorative end lacing still in place. Historically, the structure has provided a local crossing over the Allegheny River in the same location as an earlier covered bridge and ferry. It became the first free bridge crossing the river in Venango County.

Project Information: The Emlenton Bridge was documented by Yule, Jordan Associates (Camp Hill, Pennsylvania) for the Pennsylvania Department of Transportation in 1985. The documentation was undertaken to fulfill the Memorandum of Agreement, which requires recordation as a mitigative measure before demolition of the bridge. The project team consisted of Robert D. Hutton, P. E., Bridge Engineer; Christine Corbe', Historian; J. Ira Laird, Jr., Photographer; and J. Ira Laird, III, Assistant Photographer.

Edited and Transmitted by: Jean P. Yearby, HAER, 1987

I. HISTORICAL INFORMATION

A. Physical History

The bridge was built in 1883 by the Wrought Iron Bridge Company of Canton, Ohio, for the Emlenton Bridge Company (Pennsylvania Department of Highways, 1969). The structure was constructed on the pier and abutments of an earlier wooden covered bridge built in 1856. Before any bridge was built, the crossing had been serviced by a ferry. After the wooden bridge was damaged by an ice gorge, then burned in 1883, the present bridge was constructed and opened on August 23, 1883 (Venango County Historical Society, 1983). HAER Photograph No. PA-101-39 shows an engraving of the bridge as it appeared circa 1885.

Originally operated as a toll bridge, at one time the Emlenton Bridge Company charged a 12 cent toll, as shown on an extant token (Snyder, 1985). It was purchased by the county in 1898, making it the first free bridge crossing the Allegheny in Venango County (Bell, 1890). The structure became a State bridge by legislative act on June 1, 1930, when all county bridges over streams on State highway routes were taken over by the State Department of Highways.

The following repairs were recorded for the bridge, beginning in 1900:

- 1900 - New joints and new flooring installed.
- October 1908 - Structure painted.
- 1913 - Steel stringers and creosoted wood block pavement added, abutments repainted, concrete ice breaker constructed, and south abutment repaired.
- 1932 - 6-ton limit imposed. After 10' 1-beam stringers and stiffeners added to floor beams, weight limit raised to 10 tons.
- 1934 - Underwater inspection of pier (results unrecorded).
- 1941-2 - Asphalt plank wearing surface removed from floor system and HE-5 material installed.
- 1945 - Bridge closed for repair, the reopened.
- March 31, 1952 - Overloaded tractor trailer caused 51 feet of the bridge floor to collapse at the pier end of Span 1. U-bolt hangers L11 and L12 on the upstream (west) truss broke. L1 on Span 2 also broke.

- Summer 1951 - Floor system replaced with 5" open steel beam bridge flooring, additional U-bolt hangers added to lower chord panel points, concrete buttresses placed against south abutment.

- 1965 - North abutment reformed with concrete after damaged stones removed, bearing plate repaired, truss reset.

- 1969 - Retention of 3-ton limit recommended.

- 1979 - Low clearance barrier assembly installed, additional support placed under stringers at north abutment, railing and decking welded and repaired, south span stringers plated.

- October 1983 - Collision damage straightened, broken railing replaced (Pennsylvania Department of Transportation).

B. Historical Context

1. History of the Crossing

As the Allegheny River twists and curves its way south to Pittsburgh, it flows eastward past Emlenton, which became an important crossing early in the 1800s. The first known settler in the area, John Kerr, boated building stones to Pittsburgh. Andrew McCaslin operated the first store, establishing it circa 1820 (Babcock 1919). He transported goods purchased in Pittsburgh north to Emlenton in covered wagons (Bell 1890). McCaslin eventually opened a ferry across the river, which in 1834 was managed by Andrew Solinger. In the same year, Jacob Truby succeeded to management of the ferry. Ferrymen poled across the river on large flatboats filled with passengers and teams of horses (Babcock, 1919). Both managers kept a public house in conjunction with the ferry (Bell, 1980; Babcock, 1919). By 1890, Emlenton had several successful hotels (Bell, 1890).

The earliest known sawmill in Emlenton was established on Richey Run by Walter Lowrie circa 1838-39. A tannery in the same vicinity was founded by shoemaker John Whittling, who was also the "first collector of the Emlenton Bridge" (Bell., 1890). In 1854, a foundry was established.

As early as 1840, twenty iron furnaces were operating within 20 miles of Emlenton. Associated with each furnace was a store under the same management. The furnace operators were paid in

goods. When the river was navigable in the spring and fall, the ironmasters received their goods by steamboat from Pittsburgh, the base of supplies. Thus, Emlenton became an important distribution point, its warehouses filled in a few hours. The two main warehouses were owned by Jacob Truby and John Long. The latter, who owned a furnace near Shippenville (14 miles east), operated his warehouse along the river at Emlenton. Mule-drawn wagons carried the freight to the furnaces. During the summer, when the river was too shallow to navigate, and winter, when ice covered the Allegheny, Emlenton was quiet, and the furnace masters manufactured pig iron (Babcock, 1919). In 1840, John Diem was also operating a blacksmith shop on Main Street (Bell, 1890; Babcock, 1919).

Venango County began its boom years in 1859 after oil was discovered in Titusville, north of Emlenton. Between 1860 and 1870, the county population doubled in consequence (Clint, 1977). In that boom year of 1859, the village was incorporated as a borough by decree of the court of quarter sessions on January 27 (Babcock, 1919). Emlenton was named after Hannah Emlen, the wife of Joseph B. Fox, a wealthy English Quaker who acquired substantial acreage in the area. He and Andrew McCaslin owned the town site of Emlenton when it was surveyed (Bell, 1890; Babcock, 1919) and laid out in 1830 (Bicentennial Committee, 1976).

Between June 1, 1879, and May 31, 1880, two flour and grist mills were reported to be operating in Emlenton and Richland Township, along with a slaughtering and meat packing concern in Emlenton (U. S. Census of Manufactures, 1880). Before 1890, the following additional businesses were started: Emlenton Planing Mills (established 1866), Daisy Engine Company (1885), Emlenton Woolen Mills (1888), Emlenton Milling Company (1889), and several carriage and blacksmith shops (Bell, 1890). In addition, the Emlenton Refining Company was listed as operating in 1919 (Babcock, 1919). It can be presumed that the bridge at Emlenton facilitated the movement of goods and services to and from these commercial establishments.

2. History of the Emlenton Bridge Company (Original Owner)

The Emlenton Bridge Company was formed on May 2, 1854 (five years before the borough was incorporated) to contract for a bridge across the river at Emlenton. Organized at the Valley Hotel, the company elected Samuel M. Fox as president. The board of directors consisted of John Keating, Joseph Weller, R. S. Porterfield, Henry Kohlmeyer, Samuel Anderson, and J. J. McGinnis

At a second meeting on May 13, the company elected J. F. Winsch as the first secretary. On November 25, 1854, Joseph Weller was elected as the first treasurer. The company determined the bridge location on January 11, 1855, and work began in the fall of the same year (Bell, 1890).

The $16,000 contract (Venango County Historical Society, 1983) was awarded to Daniel McCain, a "bridge builder of experience" and later superintendent of bridge building in Allegheny County (Babcock, 1919). The wooden Burr truss and arch structure consisted of two spans of 230 feet each. Superintending the construction of the two stone abutments and center pier were Daniel Murray, one Blackburn, and John Graham. The structure opened as a toll bridge on October 13, 1856 (Bell, 1890).

An ice flood damaged the pier of the wooden structure in the winter of 1856-57. The company spent several thousand dollars to make repairs (Bell, 1890).

The wooden bridge was destroyed by an ice gorge during the flood of April 10, 1883 (Bell, 1890; Citizen-Press, August 23, 1883). The new existing bridge, built by the Wrought Iron Bridge Company for the Emlenton Bridge Company, opened to the public on August 16, 1883. An August 23 article in the weekly Venango County Citizen - Press (1883) termed it a "substantial bridge....Citizens will no doubt have a special celebration." Dr. A. W. Crawford had been elected President of the Emlenton Bridge Company on May 2, 1881. The remaining directors listed on the owners' plaque of the new bridge were John McCombs, Secretary; Jos. Wellen; Henry Allebach; A. B. Crawford; Samuel Naus; Hugh Keating; and J. C. Porterfield (who had been company treasurer since 1855).

Although during its first fourteen years of use the bridge produced no dividends, according to one historian, afterward it became "valuable property" (Babcock, 1919).

This statement may have been based on the fact that Venango County purchased the bridge in 1898 (Babcock, 1919), making it the first free bridge crossing the Allegheny in the county (Citizen-Press, August 4, 1898). On June 9, the following article appeared in the Citizen-Press (1898):

> At the session of court on Monday, Judge Criswell approved the report of the views and handed down the following order of court: And now, June 6, 1898, it appearing to the Court that the bridge within mentioned ought to be declared a County bridge and is necessary for the public accommodation and that the payment of tolls thereon in an unjust burden on the travelling public and the people of the township or townships near where the same is located, the within report is approved; any appeal from the award of damages within mentioned to be taken within 20 days from the date of this order.
>
> The Amount of damages was fixed at $20,000 by the viewers.

On August 4, the Citizen-Press (1898) reported that County Commissioner Joseph M. Black "came down from Franklin and declared the Emlenton Bridge free." The Commissioner deposited $20,000 into the First National Bank. The article reports that the court had first received notice of the desire for a free bridge during January. The Grand Jury approved the matter during the April court, and it was approved in June. The report notes that there was some fear that the county could not pay the $20,000 for the bridge because this expense had not been put in the county budget. Nevertheless, the money came through, the bridge was paid for, and the bridge was free. The reporter adds that the bridge "will be a good thing for Emlenton. There is talk of celebrating the event in the near future."

3. History of the Wrought Iron Bridge Company (Builder)

The Wrought Iron Bridge Company of Canton, Ohio, was one of the largest companies in the United States during its peak. By 1885, it had erected 237,000 feet of bridges in 30 States as well as Canada and Mexico. In Pennsylvania, by the same year, it had built 13,500 feet of truss bridges in 26 counties, including the Emlenton Bridge, listed as "230 x 20 feet" (Wrought Iron Bridge Company, 1885). Ohio has 62 of the company's bridges still in service (Young, 1984). One double-intersection Pratt truss built by the company had been identified in New York State (Chamberlin, 1984).

Noted for their distinctive ornamentation reflective of the Victorian era, the Wrought Iron Company embellished the Emlenton Bridge with still-extant cloverleaf portal ornaments. Decorative end posts, now gone, are shown in the 1885 engraving (Photograph 39).

David Hammond founded the Wrought Iron Bridge Company in 1866 and patented a number of designs. In 1890, he left the company to help organize the Canton Bridge Company, taking with him engineers and agents (Heald, 1949, in Pennsylvania Department of Transportation 1985 Bridge Street Bridge). The American Bridge Company absorbed Wrought Iron in 1899 (Simmons, 1978).

4. Relationship of the Emlenton Bridge to Local Surroundings and Transportation Needs

The existing bridge was built on the pier and abutments of the earlier wooden covered bridge. Its location had been decided on in 1855 (Bell, 1890). The ferry that preceded the bridge may have been at a nearby location, although the exact site is not known. The crossing may have been the easiest to reach by foot or horse at the time, possibly connecting trails crossed by wild animals and early man (Hutton, 1985).

As settlers moved into the western part of the State and iron-making became prevalent, Pittsburgh and outlying areas grew. The iron industry in the Emlenton area made the need for river transportation urgent, and a river crossing necessary because of the furnaces north of the eastward-flowing river at Emlenton. After oil was discovered, Emlenton benefited from the boom. The "progressive spirit" of that era is illustrated by the formation of the Emlenton and Shippenville Railroad Company in 1875. By September 1876, trains were running to Turkey City, east of Emlenton (Bell, 1890).

The importance of the bridge to the local and regional economy is illustrated by the fact that the covered wooden bridge was replaced within four months of its destruction by the present iron bridge. Apparently, however, the new structure did not spur any population growth, because between 1800 and 1890, the decade in which the existing structure was built, population in the borough declined. The number of inhabitants dropped from 1,140 to 1,126. Nevertheless, one historian stated in 1890 that the bridge "has always been an important adjunct to local commercial interests" (Bell, 1890).

Eight years later, the county take-over allowed free passage over the bridge. Borough population was up again in 1900, with 1,190 persons (U. S. Census, 1890), but declined to its lowest point in 30 years in 1910, with 1,110 persons. That population was relatively wealthy. Bank deposits in one Emlenton bank amounted to $1,580,624, or $1,414 per capita, a higher figure than deposits in an Oil City Bank in 1918. Apparently the bridge,

whether or not it was free, had little effect on Emlenton's population. Nevertheless, it was extremely important to the commercial viability of the borough.

5. Other Sources of Additional Information

A photograph of the 1952 bridge collapse featured in the April 2, 1952, number of the Oil City Derrick has not been reproduced here because of the poor quality of the microfilm. It is in the holdings of the Oil City Public Library, 2 Central Avenue, Oil City, Pennsylvania 16301.

No other sources of additional information are known.

6. Representation in Existing Surveys

The existing Emlenton Bridge has been listed in the Pennsylvania Historic Resource Survey and subsequently has been determined eligible for the National Register of Historic Places. The National Register Nomination Form is included in the Preliminary Case Report for the Project (U. S. Department of Transportation, 1984).

II. ENGINEERING INFORMATION

A. Description of Existing and Original Structure

The bridge, shown in its entirety in HAER Photograph Nos. PA-101-1, PA-101-2 and PA-101-3, consists of two nearly identical Whipple through-trusses, each 227 feet, 6 inches long. Each pin-connected span, also referred to as a double-intersection Pratt truss, consists of 13 panels that are 17 feet, 6 inches wide. Although the original trusses are wrought iron, many repairs of structural steel have been made.

HAER Photograph Nos. PA-101-1 through PA-101-30 identify representative features of the substructure and superstructure. HAER Photographs Nos. PA-101-31 through PA-101-38 include drawings of the bridge in plan and cross-section. The numbering system used to identify the truss members is shown in HAER Photograph No. PA-101-34. HAER Photograph No. PA-101-39 shows a historic 1885 engraving of the bridge.

Except when noted, all information in this section is based on the In-Depth Inspection Report (Pennsylvania Department of Highways, 1969).

Knowledge of the action of tension members in structures was much greater than that of compression members in 1883. Therefore, tension members such as rods and eyebars were used whenever possible, and they were used to the utmost in the Whipple truss. In the Emlenton bridge, we see eyebars for the lower chords, the diagonals, and the double-intersection top and bottom lateral bracings.

Although the bridge originally allowed a vertical clearance of 17 feet, 8-1/2 inches at the roadway centerline, a low clearance barrier installed in 1979 currently permits only 10 feet, 3 inches of clearance. Between channel curbs, the bridge is 18 feet, 10 inches wide. The chords are 29 feet, 0 inches center to center, and the trusses are spaced at 21 feet, 3 inches (p. 4).

The substructure consists of abutments (HAER Photographs No. PA-101-4 and PA-101-6) and a center pier (HAER Photograph No. PA-101-5) constructed of large stone masonry blocks. The center pier is founded on timber cribbing with a concrete and steel ice breaker. The superstructure is fixed at the center pier with expansion at the abutments; overall bridge length is 459 feet (p. 4).

In July 1913, a concrete ice breaker was added to the upstream nosing of the pier (HAER Photograph No. PA-101-5). A metal angle was placed on the centerline of the nose (p. 22).

Concrete buttresses were authorized for the south abutment in 1952 (HAER Photograph No. PA-101-6). Metal angle protection on the upstream corners is visible (p. 22).

The portal ornament is a cloverleaf design used on other company-built bridges (HAER Photographs Nos. PA-101-9 and PA-101-12). Corner brackets of diamond lattice work, which appear on the end portals of both spans, are also a hallmark on other Wrought Iron Company bridges (HAER Photograph No. PA-101-12). The erector's plaque (HAER Photograph No. PA-101-9) and erection date plate (HAER Photograph No. PA-101-10) appear on both abutment portals; the county plaque with the names of the Emlenton Bridge Company directors (HAER Photograph No. PA-101-11) appears only on the south portal of Span 2. The top chords of the existing bridge consist of built-up sections made of two 12-inch channels with varying thicknesses of top cover plates and 4" x 1/4" lacing bars on the bottom (HAER Photographs Nos. PA-101-12, PA-101-13, PA-101-15 and PA-101-16) (p. 16).

The top chord bracing consists of 1-1/4" round rods (HAER Photograph Nos. PA-101-13 and PA-101-14). The typical holders and sleevenuts for the rods, showing in HAER Photograph No. PA-101-14, are unusual design features of the structure. HAER Photograph No. PA-101-16 shows

another interesting configuration with a bent 1-1/4 round rod on the top lateral system. Details of the pin connection and turnbuckles at Hip Joint U1 are also visible. Although using the bent rod was the most economical method of construction, it would not be used today.

The sway frame occurs only at U4 and U9 on each span (Sway Frame U9 in HAER Photograph No. PA-101-15). An engraving of a typical one-span double-intersection truss showing in the 1885 catalog also features sway frames only at these locations (Wrought Iron Bridge Company, 1885, p. 7). Because today's specifications require sway frames at every other panel, this design is unusual. The sway frames and end portals transfer horizontal loads from the top chord bracing to the bottom chord and to the bearings.

The pin connections used in the Emlenton Bridge allow rotation for moving loads (HAER Photograph Nos. PA-101-5, PA-101-16, PA-101-17, PA-101-26, and PA-101-27). The eyebars required for the connections were typically mass produced. The eyebars on this bridge are reported to be loop-welded and die-forged (HAER Photograph No. PA-101-26) (Pennsylvania Historical and Museum Commission, 1982). HAER Photograph No. PA-101-25 shows eyebars continuing for the two end panels. Special seats that clamp and hold the bars occur at L1 and L2 on both trusses.

Pin connections became popular in the 19th century for their ability to rotate and their convenience in transmitting comparatively large loads that occur at the panel points from tension to tension members as well as from tension to compression members. The pins also had a disadvantage in the long run because they allowed movement and wear in the structure joints. Riveted connections, which were static, reduced use of the pins in the 1880s (Simmons, 1978, p. 15).

Vertical members from U2-L2 through U11-L11 consist to back-to-back channels fastened with 4" x 1/4"; lacing bars (HAER Photograph No. PA-101- 18 and Detail B, HAER Photograph No. PA-101-35). A washer holds the diagonal eyebar tight to the vertical member, an unusual feature (Diagonal L10-U12 in HAER Photograph No. PA-101-18). Members U1-L1 and U12-L12 are two 1-1/2" square bars (HAER Photograph No. PA-101-19 and Detail B, HAER Photograph No. PA-101-37) (p. 16). HAER Photograph No. PA-101-19 shows the U1-L1 bars rotated 90 degrees to engage the top chord pin and floor beam U-bolt on the east truss of Span 1.

The guard or handrails consist of three horizontal angles, 2-1/2" x 2" x 3/16", with 1" x 3/16" bars placed in a diamond lattice pattern between the top and intermediate horizontal angles (HAER Photograph Nos. PA-101-20, PA-101-21, and PA-101-22) (p. 15). This railing,

although similar to that included in a typical double-intersection truss shown in the 1885 catalog (p. 7) was not the original. The handrail of the Emlenton Bridge appearing in the same catalog consisted of a series of Xs, most likely of wooden construction (HAER Photograph No. PA-101-31). On the holder on the L1-U1 handrail and corresponding points, the inside bar that support today's rail appears to have been used for the original wooden railing (HAER Photograph No. PA-101-17). The original material is presumed to be wood because of the configuration shown in the 1885 engraving (HAER Photograph No. PA-101-31).

The floor system consists of 10-inch I-beam carbon steel stringers supported by built-up floor beams. The travel surface is made up of 5-inch open steel grating. A concrete filler 3-inches wide serves as a sidewalk on the upstream (west) side of the bridge (HAER Photograph No. PA-101-23).

Floor beams are hung from the main trusses by inverted U-bolts. The stringers were installed in 1932 (HAER Photograph Nos. PA-101-19, PA-101-24, PA-101-26, PA-101-27, and PA-101-28) (p. 13).

HAER Photograph No. PA-101-24 shows a representative floor beam suppport (L1). The bottom lateral bar is fastened through a bent plate. The U-bolt is the original support for the floor beam. The square rod support was added later on all the floor beams. Photograph 28 shows a bottom view of the same support; the diagonal rod can be seen to the left.

The bottom chord bracing consists of 1-1/2" round rods (HAER Photograph Nos. PA-101-19, PA-101-27, and PA-101-28) except for Panels 11, 12, and 13 of Span 1, which are 5" x 3-1/2" x 1/2" angles. This inconsistency is most likely the result of the 1952 repairs undertaken after the floor collapsed in this section. Because of the way the bracing system was built, the members are in tension only (p. 19).

Since the fixed bearings at the pier (for both spans) appear to be wrought iron, they are presumed to be original (HAER Photograph No. PA-101-29). They consist of the endpost masonry plate attached directly to the pier by three anchor bolts set outside the endpost flanges (p. 21).

At Span 1, east and west trusses, a 3/4" plate has been added to the original fixed bearings on the pier. The plate has been added between the endpost sole plates and the masonry plates. Two rivets beneath the pin in Span 2, which do not appear in Span 1, indicate a difference in fabrication of the two spans (HAER Photograph No. PA-101-29) (p. 21).

Expansion bearings are originally provided at the abutments under L0, Span 1, and L13, Span 2 (L13 in HAER Photograph No. PA-101-30). "The original bearings consisted of a 3/4" sole plate welded and riveted to the end posts; a roller nest consisting of six 2-1/4" rollers connected by two 1/4" tie bars and guided by a 1/4" center bar. The roller nest was supported by a 3/4" masonry plate which was anchored to the abutments by three (3) anchor bolts only on one (1) side of the masonry plate" (p. 20). HAER Photograph No. PA-101-30 shows a diagonal bar coming in at the left center of the picture, an unusual design feature. It was one of the few ways that the bottom lateral bracing system could terminate effectively; namely, firmly fastened to the base plate of the expansion bearing. The anchor bolts in turn fix the plate to the abutment, which can resist the force.

In 1969, the expansion bearings were "completely inoperable." In addition, the roller nest at L0, east truss, Span 1, was missing (p. 20).

B. Construction History of the Existing Structure

According to the Wrought Iron Bridge Company's 1885 advertising brochure, the company tested all materials before shipment and offered their customers' engineers supervision of manufacturing, when requested. Drills, lathes, punches, shears, steam hammers, and power and pneumatic riveters were available for construction. The company presented themselves as fast and efficient, having "shipped the iron work for a 60-feet span within 7 hours after receiving the iron from the mill." They had also "completed 100 to 140' spans at points from 100 to 300 miles distant from our works, in 8 to 15 days" (Wrought Iron Bridge Company, 1885). Although no information specific to the construction of the Emlenton Bridge is available, the company's 1885 catalog offers a good description of their operations and construction methods. Wood joists and wooden flooring were normally used, but iron joists and concrete flooring were also available if traffic on the bridge was heavy (Wrought Iron Bridge Company, 1885).

To offer the best possible estimate, the company requested such details as a plan and profile of the potential bridge site, river bed character, water depth, high water level, height of bridge above water, bridge skew, travel loads, location in or near a city, distance from a railroad station, road width, and lumber cost (Wrought Iron Bridge Company, 1885). Typically, the client would choose the site, as the Emlenton Bridge Company did, and write the specifications. Usually, the bridge contractor's salesman would view the site, select appropriate designs, and provide a bid (Simmons, 1978). Since Emlenton had a railroad running through town past the bridge, as well as a station, presumably the rail transportation facilitated shipment of

prefabricated parts to the site, where the bridge was assembled and erected. Often the bridge builder would hire and train local people to do the work (Simmons, 1978). At Emlenton, only four months passed between the destruction of the wooden bridge and the opening of the new iron bridge.

The company's double-intersection truss was used for spans of 150 to 300 feet with heavy traffic and wide roadways (Wrought Iron Bridge Company, 1885). "Heavy traffic" in those days, however, included wagon loads and teams of horses and cattle.

The "Improved Plate and Channel Truss Bridge," a double-intersection truss (Abbot's Patent), shown in the Wrought Iron Bridge Company's 1874 "Book of Designs," was presented as the "most perfect and economical truss bridge ever presented to the public." Although it had not been offered to the public until mid-1873, the company built over 1,500 feet of these structures during the rest of the year, including one in Franklin, Pennsylvania (Wrought Iron Bridge Company, 1874).

C. Description of the Site

The existing wrought iron bridge is positioned on an alignment perpendicular to the Allegheny River between the built-up section of Emlenton Borough on the north and a steeply sloping wooded hillside on the south. The bridge makes use of the existing pier and abutments of the previous wooden covered bridge built in 1856. The bridge is positioned in a north-south direction; the Allegheny River flows eastward. The bridge abutments are built into steeply sloping banks overgrown with vegetation.

IV. SOURCES OF INFORMATION

A. Engineering Drawings

The original drawings for the 1883 construction year are not available. However, the engineering drawings completed for the 1969 bridge inspection appear in the In-Depth Bridge Inspection Report, Venango County, Pennsylvania, L.R. 75, Station 97+97, Over Allegheny River, prepared for Commonwealth of Pennsylvania Department of Highways; prepared by Swindell-Dressler Company, Pittsburgh, Pennsylvania, August 1969. Plate 2 of that document notes that original drawings are not available. A copy of this report is filed at the Pennsylvania Department of Transportation District 1-0 Office, Franklin, Pennsylvania.

B. Historical Overview

The only historical view of the Emlenton Bridge uncovered was an engraving shown in the "Wrought Iron Bridges Built By Wrought Iron Bridge Co. Illustrated Pamphlet," Canton, Ohio, 1885. This pamphlet is on file at the Ohio Historical Society, 1985 Velma Avenue, Columbus, Ohio 43211.

The view shows the Emlenton Bridge, looking north. The ornamental end post caps no longer exist on the bridge. The handrail fencing is also different than the existing lattice configuration. In the 1885 engraving it is constructed with large Xs between each intermediate post, a configuration that indicates wooden construction. The 1885 bridge deck also appears to consist of wood instead of the current steel grating.

C. Interviews:

Interviews about the Emlenton Bridge were conducted with representative of 1) the Venango County Historical Society, 2) the Ohio Historical Society, 3) the Ohio Department of Transportation, 4) the Pennsylvania Department of Transportation, 5) the Pennsylvania Historical and Museum Commission, and 6) the Emlenton Borough Council, as well as 7) a borough historian. The following information and documents were provided by each source:

1. Pennsylvania Department of Transportation

   In-depth Inspection Report (1969)
   Final Environmental Impact Statement (1976)
   Draft Environmental Impact Statement (n.d.)
   List of Bridge Repairs, March 23, 1984

2. Ohio Historical Society, 1985 Velma Ave., Columbus, Ohio 43211

   David Simmons (Telephone Interview, March 23, 1984)
   "Bridge Preservation in Ohio," Ohio Cities & Villages, August 1978

3. Ohio Department of Transportation, Columbus, Ohio

   Karen Young, (Telephone Interview, March 23, 1984)

4. New York Department of Transportation, Albany, New York

   William Chamberlin (Telephone Interview, April 5, 1984)

5. Venango County Historical Society, Franklin, Pennsylvania

Lois Minnick (Personal Interview, March 28, 1984)

a. Venango County Historical Society, Venango County Panorama, 1983, p. 39. Information on Emlenton ferry, covered wooden bridge, construction and early history of existing bridge. Although information is sparse, an 1872 photograph of the previously-covered wooden bridge obtained from the Hazel Crawford Collection appears in Venango County Panorama.

b. Information on opening, county take over, and contemporary newspapers located in Venango County Public Library, Franklin, Pennsylvania (Helen Ray, Librarian).

6. Pennsylvania Historical and Museum Commission, Harrisburg, PA

Dan Deibler (Personal Interview, April 3, 1984)
Pennsylvania Historic Resource Survey Form, Emlenton Bridge

7. Beverly Snyder, Local Historian, Emlenton, PA (Personal Interview, May 21, 1985)

a. Information on tolls of original wooden and wrought iron bridges (and original toll 12 cent token)

b. Bell, Howard. History of Venango County, Pennsylvania, Its Past and Present. Brown and Runk Co., 1890.

D. Bibliography

1. Primary and Unpublished Sources

1. Tenth U. S. Census in Pennsylvania, 1880, Manufactures, Emlenton and Richland Township. June 1, 1879 to May 31, 1880.

2. Hutton, Robert D., Bridge Engineer, Letter to Christine Corbe', November 5, 1985.

2. Secondary and Published Sources

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E. Sources Investigated Without Result

The following sources were investigated, but they had no historical information on the Emlenton Bridge:

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3. Emlenton Borough Council, James Miller (Telephone Interview, October 18, 1985).

4. Pennsylvania Archives, Forster Street, Harrisburg, PA.

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F. Likely Sources Not Yet Investigated

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G. Supplemental Material

None.

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B. Agency Requesting Information

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